

SEQUENCE LISTING

<110> Allen, Stephen M.
Caimi, Perry G.
Stoop, Johan M.

<120> Fructan Biosynthetic Enzymes

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<150> 60/244,273

<151> 2000-10-10

<150> 60/269,543

<151> 2001-02-16

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<212> DNA

<213> Dimorphotheca sinuata

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 <212> PRT
 <213> Dimorphotheca sinuata

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 35 40 45
 Leu Ile Val Ser Val Leu Phe Leu Asn Gln Gln Asn Ser Ser His Ser
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 Thr Thr Asn Ser Lys Ser Ile Ser Gln Ser Asp Arg Leu Ile Trp Glu
 65 70 75 80
 Arg Thr Ser Phe His Phe Gln Pro Ala Lys Asn Phe Ile Tyr Asp Pro
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 Asn Gly Pro Leu Phe His Met Gly Trp Tyr His Leu Phe Tyr Gln Tyr
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 Asn Pro Tyr Gly Pro Val Trp Gly Asn Met Ser Trp Gly His Ser Val
 115 120 125
 Ser Lys Asp Met Ile Asn Trp Phe Glu Leu Pro Val Ala Leu Val Pro
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 Thr Glu Trp Tyr Asp Ile Glu Gly Val Leu Ser Gly Ser Thr Thr Val
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 Phe Ser Gln Leu Gln Cys Lys Ala Val Pro Val Asn Ile Ser Asp Pro
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 Leu Leu Ile Glu Trp Val Lys Tyr Asp Gly Asn Pro Ile Leu Tyr Thr
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 Pro Pro Gln Ile Gly Leu Lys Asp Tyr Arg Asp Pro Ser Thr Val Trp
 210 215 220
 Thr Gly Pro Asp Gly Lys His Arg Met Ile Met Gly Ser Lys Arg Asn
 225 230 235 240
 Lys Thr Gly Leu Val Leu Val Tyr His Thr Thr Asp Phe Thr Asn Tyr
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Lys Val Phe Leu Phe Asn Asn Ala Thr Gly Thr Ser Val Lys Ala Ser
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<212> DNA
<213> *Parthenium argentatum* Grey

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<210> 4
<211> 609
<212> PRT
<213> *Parthenium argentatum* Grey

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 35 40 45
 Phe Phe Ile Ser Ala Phe Leu Phe Ile Val Leu Asn Gln Gln Asn Ser
 50 55 60
 Thr Asn Ile Ser Val Lys Tyr Ser Gln Ser Asp Arg Leu Thr Trp Glu
 65 70 75 80
 Arg Thr Ala Phe His Phe Gln Pro Ala Lys Asn Phe Ile Tyr Asp Pro
 85 90 95
 Asn Gly Gln Met Tyr Tyr Met Gly Trp Tyr His Leu Phe Tyr Gln Tyr
 100 105 110
 Asn Pro Tyr Ala Pro Val Trp Gly Asn Met Ser Trp Gly His Ser Val
 115 120 125
 Ser Lys Asp Met Ile Asn Trp Tyr Glu Leu Pro Val Ala Ile Val Pro
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 Thr Glu Trp Tyr Asp Ile Glu Gly Val Leu Ser Gly Ser Ile Thr Val
 145 150 155 160
 Leu Pro Asn Gly Gln Ile Phe Ala Leu Tyr Thr Gly Asn Ala Asn Asp
 165 170 175
 Phe Ser Gln Leu Gln Cys Lys Ala Val Pro Val Asn Ser Ser Asp Pro
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 Pro Pro Gly Ile Gly Leu Lys Asp Tyr Arg Asp Pro Ser Thr Val Trp
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 Thr Gly Pro Asp Gly Lys His Arg Met Ile Met Gly Thr Lys Arg Gly
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 Asn Thr Gly Met Ile Leu Val Tyr His Thr Thr Asp Tyr Thr Asn Tyr
 245 250 255
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 260 265 270
 Glu Cys Val Asp Phe Tyr Pro Val Ser Leu Thr Asn Asp Ser Ala Leu
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 Trp Glu Gly Tyr Gly Met Asp Phe Tyr Ser Ile Gly Thr Tyr Asp Ala
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 Phe Asn Asp Lys Trp Thr Pro Asp Asn Pro Glu Leu Asp Val Gly Ile
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Gly Leu Arg Cys Asp Tyr Gly Arg Phe Phe Ala Ser Lys Ser Ile Phe
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 Asp Asn Ala Asp Asp Asp Leu Ser Arg Gly Trp Ala Thr Ile Tyr Asn
 370 375 380
 Val Gly Arg Thr Ile Val Leu Asp Arg Lys Thr Gly Thr His Leu Leu
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 Phe Lys Glu Ile Lys Leu Glu Pro Gly Ser Ile Ala Pro Leu Asp Ile
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 Gly Thr Ala Thr Gln Leu Asp Ile Val Ala Thr Phe Lys Val Asp Glu
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 Ala Ala Leu Asn Ala Thr Ser Glu Thr Asp Asp Asn Phe Ala Cys Thr
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 Ala Val Leu Ala Asp Gly Thr Leu Ser Glu Leu Thr Pro Val Tyr Phe
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 Asp Lys Leu Arg Ser Ser Leu Asp Phe Asp Lys Glu Arg Val Val Tyr
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 Gly Ser Thr Val Pro Val Leu Asp Asp Glu Glu Leu Thr Met Arg Leu
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 Ala Ile Thr Ser Arg Val Tyr Pro Thr Lys Ala Ile Tyr Glu Gly Ala
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 Lys Leu Phe Leu Phe Asn Asn Ala Thr Asp Thr Ser Val Lys Ala Ser
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<210> 5
 <211> 1333
 <212> DNA
 <213> Helianthus sp.

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aaaaaaaaa aaa 1333

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<212> PRT
<213> Helianthus sp.

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Pro Asn Thr Asp Met Trp Glu Cys Val Asp Phe Tyr Pro Val Ser Leu
50 55 60
Thr Asn Asp Ser Ala Leu Asp Met Ala Ala Tyr Gly Ser Gly Ile Lys
65 70 75 80
His Val Ile Lys Glu Ser Trp Glu Gly His Gly Met Asp Trp Tyr Ser
85 90 95
Ile Gly Thr Tyr Asp Ala Ile Asn Asp Lys Trp Thr Pro Asp Asn Pro
100 105 110
Glu Leu Asp Val Gly Ile Gly Leu Arg Cys Asp Tyr Gly Lys Phe Phe
115 120 125
Ala Ser Lys Ser Leu Tyr Asp Pro Leu Lys Lys Arg Arg Val Thr Trp
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Ala Tyr Val Gly Glu Ser Asp Ser Val Asp Gln Asp Leu Ser Arg Gly
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Trp Ala Thr Val Tyr Asn Val Gly Arg Thr Ile Val Leu Asp Arg Lys
 165 170 175
 Thr Gly Thr His Leu Leu His Trp Pro Val Glu Glu Val Glu Ser Leu
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 Arg Tyr Asn Gly Gln Glu Phe Lys Glu Ile Glu Leu Glu Pro Gly Ser
 195 200 205
 Ile Ile Pro Leu Asp Ile Gly Thr Ala Thr Gln Leu Asp Ile Val Ala
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 Thr Phe Glu Val Asp Gln Ala Ala Leu Asn Ala Thr Ser Glu Thr Asp
 225 230 235 240
 Asp Ile Tyr Gly Cys Thr Thr Ser Leu Gly Ala Ala Gln Arg Gly Ser
 245 250 255
 Leu Gly Pro Phe Gly Leu Ala Val Leu Ala Asp Gly Thr Leu Ser Glu
 260 265 270
 Leu Thr Pro Val Tyr Phe Tyr Ile Ala Lys Lys Ala Asp Gly Gly Leu
 275 280 285
 Ser Thr His Phe Cys Thr Asp Lys Leu Arg Ser Ser Leu Asp Tyr Asp
 290 295 300
 Gly Gln Arg Val Val Tyr Gly Ser Thr Val Pro Val Leu Asp Asp Glu
 305 310 315 320
 Glu Leu Thr Met Arg Leu Leu Val Asp His Ser Ile Val Glu Gly Phe
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 Ala Gln Gly Gly Arg Thr Val Ile Thr Ser Arg Val Tyr Pro Thr Lys
 340 345 350
 Ala Ile Tyr Glu Gln Ala Lys Leu Phe Leu Phe Asn Asn Ala Thr Gly
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<210> 7

<211> 1844

<212> DNA

<213> Triticum aestivum

<400> 7

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<210> 8
 <211> 495
 <212> PRT
 <213> Triticum aestivum

<400> 8
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 35 40 45
 Tyr Thr Gly Ala Thr Asn Ala Ser Ala Ile Glu Val Gln Cys Ile Ala
 50 55 60
 Thr Pro Ala Asp Asn Asp Pro Phe Leu Arg Arg Trp Thr Lys His
 65 70 75 80
 Pro Ala Asn Pro Val Ile Trp Ser Pro Pro Gly Ile Gly Thr Lys Asp
 85 90 95
 Phe Arg Asp Pro Met Thr Ala Trp Tyr Asp Glu Ser Asp Asp Thr Trp
 100 105 110
 Arg Thr Leu Leu Gly Ser Lys Asp Asp Gln Asp Gly His His Asp Gly
 115 120 125
 Ile Ala Met Met Tyr Lys Thr Lys Asp Phe Leu Asn Tyr Glu Leu Ile
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 Pro Gly Ile Leu His Arg Val Glu Arg Thr Gly Glu Trp Glu Cys Ile
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Leu	His	Val	Leu	Lys	Ala	Ser	Met	Asp	Asp	Glu	Arg	His	Asp	Tyr	Tyr	180	185	190
Ser	Leu	Gly	Thr	Tyr	Asp	Ser	Ala	Ala	Asn	Thr	Trp	Thr	Pro	Ile	Asp	195	200	205
Pro	Asp	Leu	Asp	Leu	Gly	Ile	Gly	Leu	Arg	Tyr	Asp	Trp	Gly	Lys	Phe	210	215	220
Tyr	Ala	Ser	Thr	Ser	Phe	Tyr	Asp	Pro	Ala	Lys	Lys	Arg	Arg	Val	Leu	225	230	235
Met	Gly	Tyr	Val	Gly	Glu	Val	Asp	Ser	Lys	Arg	Ala	Asp	Val	Val	Lys	245	250	255
Gly	Trp	Ala	Ser	Ile	Gln	Ser	Val	Pro	Arg	Thr	Ile	Ala	Leu	Asp	Glu	260	265	270
Lys	Thr	Arg	Thr	Asn	Leu	Leu	Leu	Trp	Pro	Val	Glu	Glu	Ile	Glu	Thr	275	280	285
Leu	Arg	Leu	Asn	Ala	Thr	Glu	Leu	Ser	Asp	Val	Thr	Met	Asn	Thr	Gly	290	295	300
Ser	Val	Ile	His	Ile	Pro	Leu	Arg	Gln	Gly	Thr	Gln	Leu	Asp	Ile	Glu	305	310	315
Ala	Thr	Phe	His	Leu	Asp	Ala	Ser	Ala	Val	Ala	Ala	Leu	Asn	Glu	Ala	325	330	335
Asp	Val	Gly	Tyr	Asn	Cys	Ser	Ser	Ser	Gly	Gly	Ala	Val	Asn	Arg	Gly	340	345	350
Ala	Leu	Gly	Pro	Phe	Gly	Leu	Leu	Val	Leu	Ala	Ala	Gly	Asp	Arg	Arg	355	360	365
Gly	Glu	Gln	Thr	Ala	Val	Tyr	Phe	Tyr	Val	Ser	Arg	Gly	Leu	Asp	Gly	370	375	380
Gly	Leu	His	Thr	Ser	Phe	Cys	Gln	Asp	Glu	Leu	Arg	Ser	Ser	Arg	Ala	385	390	395
Lys	Asp	Val	Thr	Lys	Arg	Val	Ile	Gly	Ser	Thr	Val	Pro	Val	Leu	Asp	405	410	415
Gly	Glu	Ala	Phe	Ser	Met	Arg	Val	Leu	Val	Asp	His	Ser	Ile	Val	Gln	420	425	430
Gly	Phe	Ala	Met	Gly	Gly	Arg	Thr	Thr	Met	Thr	Ser	Arg	Val	Tyr	Pro	435	440	445
Met	Glu	Ala	Tyr	Gln	Glu	Ala	Lys	Val	Tyr	Leu	Phe	Asn	Asn	Ala	Thr	450	455	460
Gly	Ala	Ser	Val	Met	Ala	Glu	Arg	Leu	Val	Val	His	Glu	Met	Asp	Ser	465	470	475

Ala His Asn Gln Leu Ser Asn Met Asp Asp Tyr Ser Tyr Val Gln
485 490 495

<210> 9
<211> 1612
<212> DNA
<213> Triticum aestivum

<400> 9
gcacgagacg acatcctggg ggtcctttcg ggctctatga cgggtgctacc aaatggcacg 60
gtcatcatga tctacacggg ggccaccaac gcctctgccc ttgagggtga gtgcacgcgc 120
accoccgccg accccaacga ccccttctct cgcccgctgga ccaagcaccg cgccaacccc 180
gtcatctggt cgcgcgcggg gatcggcacc aaggattttc gagaccgat gactgctttg 240
taoatgaat ctgatgacac atggcgcaac ctocctgggt ccaaggatga ccacgacggt 300
caccacgatg ggatcgccat gatgtacaag accaaggact tcttaacta cgagctcatc 360
ccgggtatct tgcacgagt ccacgcgacc ggcgagtggt agtgcattga cttctacct 420
gtcgcccaca gaagcaacga caactcatcg gagatgttgc acgtgttgaa ggcgagcatg 480
gacgacgaac ggcacgacta ctactcgcta ggcacgtacg actcggcacg aaacgcgttg 540
acgcgatgac acccgagctc cgacttgggg atcgggctga gatacgaagt gggttaagt 600
tatcggtcca cctcgttcta tgcacggcca aagaagcgcc gcgtgctgat ggggtacgct 660
ggcgaggtcg actccaagcg ggctgatgtc gtgaagggat gggcctcgat tcaatcagtt 720
ccaaggacaa ttgctctcga cgagaagacc cggacgaacc tctctctctg gcccggtgag 780
gagattgaga cctcgcgctc caacgccacc gaacttagcg acgtcaccct taacaccggc 840
tccgtcatcc atatccgctc ccgcacaggc actcagctcg acatcgaggc aactttccac 900
cttgatgctt ctgcgctcgc tgcctcaat gaggcgatg tgggtacaa ctgcagcagc 960
agcgcggtcg ctgttaacgg cggcgcgcta ggcctctctg gcctcctctg cctcgtgct 1020
ggtagccggc gtggcgagca aacggcggtg tatttctacg tgtctagggg gtctcagggg 1080
ggcctccata ccagcttctg ccaagacgag ttgcggtcgt caccggccaa ggaatgtgac 1140
aagcggtgga ttgggagcac ggtgcgggtg ctgcagcgcg aggccttctc gatgaggggt 1200
ctcgttgacc actccatcgt gcagggtctc gcgatgggag ggaggaaccg gatgacgtcg 1260
cggtgttacc cgatggaggc ctatcaggag gcaaaagtgt actgttcaa caatgcgacc 1320
gggtgcagcg tcatggcgga aaggctcgtc gtgcacgaga tggactcagc acacacacag 1380
ctctccaata tggacgatca ctctgatgtt caatgaagct cttgcatctc atcagtaata 1440
agctacattg gatcaaacg gcgcaccaag gaaggccaag acatatgtaa atgattccgc 1500
acagcctcgc ttgcagaatt gaaacatcta tcttgggtc atgtttgtga ttgatgtcac 1560
tgtgaactac agtatattac ttgttgggc gtgaaaaaaa aaaaaaaaaa aa 1612

<210> 10
<211> 471
<212> PRT
<213> Triticum aestivum

<400> 10
Ala Arg Asp Asp Ile Leu Gly Val Leu Ser Gly Ser Met Thr Val Leu
1 5 10 15
Pro Asn Gly Thr Val Ile Met Ile Tyr Thr Gly Ala Thr Asn Ala Ser
20 25 30
Ala Val Glu Val Gln Cys Ile Ala Thr Pro Ala Asp Pro Asn Asp Pro
35 40 45
Phe Leu Arg Arg Trp Thr Lys His Pro Ala Asn Pro Val Ile Trp Ser
50 55 60
Pro Pro Gly Ile Gly Thr Lys Asp Phe Arg Asp Pro Met Thr Ala Trp
65 70 75 80
Tyr Asp Glu Ser Asp Asp Thr Trp Arg Thr Leu Leu Gly Ser Lys Asp
85 90 95

Thr Met Thr Ser Arg Val Tyr Pro Met Glu Ala Tyr Gln Glu Ala Lys
420 425 430

Val Tyr Leu Phe Asn Asn Ala Thr Gly Ala Ser Val Met Ala Glu Arg
435 440 445

Leu Val Val His Glu Met Asp Ser Ala His Asn Gln Leu Ser Asn Met
450 455 460

Asp Asp His Ser Tyr Val Gln
465 470

<210> 11
<211> 476
<212> DNA
<213> *Triticum aestivum*

<400> 11
gcacgagcca cgtatgcgtc gcgggtgtac ccgatggagg cctatcagga ggcaaaagtg 60
tacttgttca acaatgccac cgtgcccagc gttacggcgg aaaggctcgt cgtgcacgag 120
atggactcag cacacaacca gctctccaat atggacgatt actcgtatgt tcaatgaagc 180
tcttgcatct catcagtaat aagctacatt ggatcaaaaga cgctcaccaa ggaaggccaa 240
gacatatatt taaacgatcc cgacagacct cgcttgacga attgaaacat ctatcctttg 300
gtcatgttct gcattgatgt cacagtgaac tatattactt tgttgggtgt aggatcgata 360
tagtttgggt ggttggaact ttgtttgttt acatagttaa ccggtgtggt ctgcataata 420
agcttatgtg tttgtttaga aaatgaatta ttgtgtgtta aaaaaaaaaa aaaaaa 476

<210> 12
<211> 58
<212> PRT
<213> *Triticum aestivum*

<400> 12
Ala Arg Ala Thr Met Thr Ser Arg Val Tyr Pro Met Glu Ala Tyr Gln
1 5 10 15

Glu Ala Lys Val Tyr Leu Phe Asn Asn Ala Thr Gly Ala Ser Val Thr
20 25 30

Ala Glu Arg Leu Val Val His Glu Met Asp Ser Ala His Asn Gln Leu
35 40 45

Ser Asn Met Asp Asp Tyr Ser Tyr Val Gln
50 55

<210> 13
<211> 2093
<212> DNA
<213> *Parthenium argentatum* Grey

<400> 13
gcacgagcgt gtacatagta aaaaaacccct ccagccacca catgatgggt tcatctacca 60
ccacctcccc tctcattctc cacgatgalc ctgaaaaacct ccaggaaccc accggattta 120
cggggggttcg tcgtccatcc atcgcaaaag cgctttgcgt aaccttgtt tcggttatgg 180
taactctgtgg tctgggttgcgt gtaatcagca accagacaca ggtaccacaa gttagccaaca 240
gccatcaagg tgccgccacc acattcacaa ctacagttgcc aaaaatagat atgaaacggg 300
ttccggggaga gttgattcgg ggtgctgatg tccaatggca acgctccgct tatcattttc 360
aacctgcacaa aaactacatt agtgatcctg atggcccaat gtatcacatg ggatgggtacc 420
atctatttta tcagtaacac ccagaatctg ccatatgggg caacatcaca tggggctacc 480

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ccgatatccaa agacatgac aactgggtcc atctcccttt cgcacatggt cgggaccatt 540
ggtagacacat cgaaggcgct atgacaggtt ccgcacacagt cctcccaaac ggtgagatca 600
tcatgttttta caggggcaat gcgtacgac tctcccaagt acaatgctta gcgtacgcag 660
tcaactcactc agatccactt ctatagagt ggaaaaaata cgaaggcaac ccggttttat 720
tgccgcgcgc aggggtgggt tacaaggatt ttccggaccc atctacattg ttgctgggcc 780
ccgatgggtga atatagaagt gtaatgggggt ccaagcacaa cgagactatt ggttgtgctt 840
tgatttacca taccactaat tttagcatt ttgaattgaa tgaggagggt cttcatgcgg 900
tcccacatac tggtagtggt gaatgcgttg atctttatcc ggtatccacc acacacacaa 960
acgggttgga catggtggat aatggggcaa atgtaaaata cgtgttgaaa caaagtgggg 1020
atgaagatga ccatgatgg tatgcgattg gaagttaga ttgggtgaat gataagtggt 1080
accoggatga cccggaaaac gatgtgggta tcgggttaag atacgattac ggaaagtttt 1140
atgcgtccaa gacgttttat gaccaacata agaaaaaggag ggtcctttgg gctatgttg 1200
gagaaaccga tcccgaaaag tatgacctta caaagggatg ggctaacata ttgaattattc 1260
caaggaccgt cgttttgac acgaaaaacta aaaccaattt gattcaatgg ccaattgagg 1320
aaaccgaaaa acttaggtcg aaaaagtatg ataaatttgt agatgtggag cttcgaccgc 1380
ggtagctcat tccctcgag ataggtacag ccacacagtt ggatatagtt ccaattgagg 1440
aagtgtatca aatgtagttg gaatcaacgc tagaagccga tgttctatcc aactgcacga 1500
ctagttgttg ctcagttgga aggggcgtgt tgggaccgtt tggtagtggt gttctagctg 1560
atgcgccagc caccgaaaca ctccctgtgt atttctatat tgcaaaagat accgacggga 1620
cgtaagaac ctacttttgt gctgatgaaa caagatcacc caaggatgta gacgtgggga 1680
aatgggtgta tgggaagcagt gttcctgttc tccctaacga aaagtacaat atgaggttac 1740
tggtggtatc ttcatagtg gagggatttg cacaacacgc aagaacggtg gtgacatcga 1800
gagtgatatc aacgaaggca atttacaacg ctcgcaaggt gtttttgttc aacaacgcga 1860
ccggggtagg ggtgaaggcg tcggtcaaga tttggaagt ggcggaagca gaactcaacc 1920
ctttccagat tactgggtgg acttcttgat ggctagattt tggccctat atgtgtgtgt 1980
tactatcgtg aggtatatgt cttggactgt gggggtatta ttgaatttg atatgtatgt 2040
tctgttactt ttgaggttct agtttaaaaa aaaaaaaaaa aaaaaaaaaa aaa 2093

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<210> 14
<211> 635
<212> PRT
<213> Parthenium argentatum Grey

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<400> 14
Met Met Ala Ser Ser Thr Thr Thr Ser Pro Leu Ile Leu His Asp Asp
1 5 10 15

Pro Glu Asn Leu Gln Glu Pro Thr Gly Phe Thr Gly Val Arg Arg Pro
20 25 30

Ser Ile Ala Lys Ala Leu Cys Val Thr Leu Val Ser Val Met Val Ile
35 40 45

Cys Gly Leu Val Ala Val Ile Ser Asn Gln Thr Gln Val Pro Gln Val
50 55 60

Ala Asn Ser His Gln Gly Ala Ala Thr Thr Phe Thr Thr Gln Leu Pro
65 70 75 80

Lys Ile Asp Met Lys Arg Val Pro Gly Glu Leu Asp Ser Gly Ala Asp
85 90 95

Val Gln Trp Gln Arg Ser Ala Tyr His Phe Gln Pro Asp Lys Asn Tyr
100 105 110

Ile Ser Asp Pro Asp Gly Pro Met Tyr His Met Gly Trp Tyr His Leu
115 120 125

Phe Tyr Gln Tyr Asn Pro Glu Ser Ala Ile Trp Gly Asn Ile Thr Trp
130 135 140

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Gly His Ser Val Ser Lys Asp Met Ile Asn Trp Phe His Leu Pro Phe
 145 150 155 160
 Ala Met Val Pro Asp His Trp Tyr Asp Ile Glu Gly Val Met Thr Gly
 165 170 175
 Ser Ala Thr Val Leu Pro Asn Gly Glu Ile Ile Met Leu Tyr Thr Gly
 180 185 190
 Asn Ala Tyr Asp Leu Ser Gln Val Gln Cys Leu Ala Tyr Ala Val Asn
 195 200 205
 Ser Ser Asp Pro Leu Leu Ile Glu Trp Lys Lys Tyr Glu Gly Asn Pro
 210 215 220
 Val Leu Leu Pro Pro Pro Gly Val Gly Tyr Lys Asp Phe Arg Asp Pro
 225 230 235 240
 Ser Thr Leu Trp Leu Gly Pro Asp Gly Glu Tyr Arg Met Val Met Gly
 245 250 255
 Ser Lys His Asn Glu Thr Ile Gly Cys Ala Leu Ile Tyr His Thr Thr
 260 265 270
 Asn Phe Thr His Phe Glu Leu Asn Glu Glu Val Leu His Ala Val Pro
 275 280 285
 His Thr Gly Met Trp Glu Cys Val Asp Leu Tyr Pro Val Ser Thr Thr
 290 295 300
 His Thr Asn Gly Leu Asp Met Val Asp Asn Gly Pro Asn Val Lys Tyr
 305 310 315 320
 Val Leu Lys Gln Ser Gly Asp Glu Asp Arg His Asp Trp Tyr Ala Ile
 325 330 335
 Gly Ser Tyr Asp Trp Val Asn Asp Lys Trp Tyr Pro Asp Asp Pro Glu
 340 345 350
 Asn Asp Val Gly Ile Gly Leu Arg Tyr Asp Tyr Gly Lys Phe Tyr Ala
 355 360 365
 Ser Lys Thr Phe Tyr Asp Gln His Lys Lys Arg Arg Val Leu Trp Gly
 370 375 380
 Tyr Val Gly Glu Thr Asp Pro Glu Lys Tyr Asp Leu Thr Lys Gly Trp
 385 390 395 400
 Ala Asn Ile Leu Asn Ile Pro Arg Thr Val Val Leu Asp Thr Lys Thr
 405 410 415
 Lys Thr Asn Leu Ile Gln Trp Pro Ile Glu Glu Thr Glu Lys Leu Arg
 420 425 430
 Ser Lys Lys Tyr Asp Lys Phe Val Asp Val Glu Leu Arg Pro Gly Ser
 435 440 445
 Leu Ile Pro Leu Glu Ile Gly Thr Ala Thr Gln Leu Asp Ile Val Ala
 450 455 460

aaccgatccc caaaagtatg acatttcaaa gggatgggct aacattttga atattccaag 1260
 aaccgctggt ttggacacaa aaacccaaac caatttgatt caatggccaa tcgaggaaac 1320
 cgaaaaccctt aggtcaaaaa cgtacgatga atttaaagac gtggagcttc gaccggggtc 1380
 actcgtttccc cttgagatag gcacagccac acagttggat atagttgcga cattcgaaat 1440
 cgaccaaaag atgttggaaat caacgctaga ggcgatgttt ctattcaatt gcacgatag 1500
 tgaaggtctg gttgcaagggt gtggttggg accgtttggt gtggtggttc tagccgatgc 1560
 ccaacgctcc gaacaacttc ctgtatactt ctatatcgca aaagatatcg atggaacctc 1620
 acgaacttac ttttgtgcog atgaacaag atcatccaag gatgtaagcg tagggaaatg 1680
 ggtgtacgga agcagtggtc ctgtcctccc aggcgaaaag tacaatatga ggttattggt 1740
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 gtatccaaca aaggcgatct acaacgctgc gaaggtgttt ttgttcaaca acgcgactgg 1860
 gatcagtggt aaggcgctga tcaagatctg gaagatggcg aaagcagaac tcaatccttt 1920
 cctcttctct ggtgtgactt ttgaactttg atggttagat ttggaccct atatagttat 1980
 tatcatgaag cataagtttg gactggagggt ggtattattg taattttata tgcattgttc 2040
 attactgtg agtttatagt atataattaa attattatta ttaaaaaaaa aaaaaaaaaa 2100
 aaaaaaa 2107

<210> 16
 <211> 630
 <212> PRT
 <213> Helianthus sp.

<400> 16
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 Pro Glu Asn Leu Pro Glu Leu Thr Gly Ser Pro Thr Thr Arg Arg Leu
 20 25 30
 Ser Ile Ala Lys Val Leu Ser Gly Ile Leu Val Ser Val Leu Val Thr
 35 40 45
 Cys Ala Leu Val Ala Leu Ile Asn Asn Gln Thr Tyr Glu Pro Pro Ala
 50 55 60
 Ala Thr Thr Phe Ala Thr Gln Leu Pro Asn Ile Asp Leu Lys Arg Val
 65 70 75 80
 Pro Gly Lys Leu Asp Ser Ser Ala Glu Val Glu Trp Gln Arg Ser Ala
 85 90 95
 Tyr His Phe Gln Pro Asp Lys Asn Phe Ile Ser Asp Pro Asp Gly Pro
 100 105 110
 Met Tyr His Met Gly Trp Tyr His Leu Phe Tyr Gln Tyr Asn Pro Glu
 115 120 125
 Ser Ala Ile Trp Gly Asn Ile Thr Trp Gly His Ser Val Ser Lys Asp
 130 135 140
 Met Ile Asn Trp Phe His Leu Pro Phe Ala Met Val Pro Asp His Trp
 145 150 155 160
 Tyr Asp Ile Glu Gly Val Met Thr Gly Ser Ala Thr Val Leu Pro Asn
 165 170 175
 Gly Gln Ile Ile Met Leu Tyr Thr Gly Asn Ala Tyr Asp Leu Ser Gln
 180 185 190

Val Gln Cys Leu Ala Tyr Ala Val Asn Ser Ser Asp Pro Leu Leu Ile
 195 200 205
 Glu Trp Lys Lys Tyr Glu Gly Asn Pro Val Leu Phe Pro Pro Pro Gly
 210 215 220
 Val Gly Tyr Lys Asp Phe Arg Asp Pro Ser Thr Leu Trp Leu Gly Pro
 225 230 235 240
 Asp Gly Glu Tyr Arg Met Val Met Gly Ser Lys His Asn Glu Thr Ile
 245 250 255
 Gly Cys Ala Leu Ile Tyr His Thr Thr Asn Phe Thr His Phe Glu Leu
 260 265 270
 Lys Glu Glu Val Leu His Ala Val Pro His Thr Gly Met Trp Glu Cys
 275 280 285
 Val Asp Leu Tyr Pro Val Ser Thr Val His Thr Asn Gly Leu Asp Met
 290 295 300
 Val Asp Asn Gly Pro Asn Val Lys Tyr Val Leu Lys Gln Ser Gly Asp
 305 310 315
 Glu Asp Arg His Asp Trp Tyr Ala Ile Gly Ser Tyr Asp Val Val Asn
 325 330 335
 Asp Lys Trp Tyr Pro Asp Asp Pro Glu Asn Asp Val Gly Ile Gly Leu
 340 345 350
 Arg Tyr Asp Phe Gly Lys Phe Tyr Ala Ser Lys Thr Phe Tyr Asp Gln
 355 360 365
 His Lys Lys Arg Arg Val Leu Trp Gly Tyr Val Gly Glu Thr Asp Pro
 370 375 380
 Gln Lys Tyr Asp Ile Ser Lys Gly Trp Ala Asn Ile Leu Asn Ile Pro
 385 390 395 400
 Arg Thr Val Val Leu Asp Thr Lys Thr Lys Thr Asn Leu Ile Gln Trp
 405 410 415
 Pro Ile Glu Glu Thr Glu Asn Leu Arg Ser Lys Thr Tyr Asp Glu Phe
 420 425 430
 Lys Asp Val Glu Leu Arg Pro Gly Ser Leu Val Pro Leu Glu Ile Gly
 435 440 445
 Thr Ala Thr Gln Leu Asp Ile Val Ala Thr Phe Glu Ile Asp Gln Lys
 450 455 460
 Met Leu Glu Ser Thr Leu Glu Ala Asp Val Leu Phe Asn Cys Thr Thr
 465 470 475 480
 Ser Glu Gly Ser Val Ala Arg Gly Ala Leu Gly Pro Phe Gly Val Val
 485 490 495
 Val Leu Ala Asp Ala Gln Arg Ser Glu Gln Leu Pro Val Tyr Phe Tyr
 500 505 510

Ile Ala Lys Asp Ile Asp Gly Thr Ser Arg Thr Tyr Phe Cys Ala Asp
 515 520 525
 Glu Thr Arg Ser Ser Lys Asp Val Ser Val Gly Lys Trp Val Tyr Gly
 530 535 540
 Ser Ser Val Pro Val Leu Pro Gly Glu Lys Tyr Asn Met Arg Leu Leu
 545 550 555 560
 Val Asp His Ser Ile Val Glu Gly Phe Ala Gln Asn Gly Arg Thr Val
 565 570 575
 Val Thr Ser Arg Val Tyr Pro Thr Lys Ala Ile Tyr Asn Ala Ala Lys
 580 585 590
 Val Phe Leu Phe Asn Asn Ala Thr Gly Ile Ser Val Lys Ala Ser Ile
 595 600 605
 Lys Ile Trp Lys Met Ala Lys Ala Glu Leu Asn Pro Phe Pro Leu Pro
 610 615 620
 Gly Trp Thr Phe Glu Leu
 625 630
 <210> 17
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 <212> PRT
 <213> Helianthus tuberosus
 <400> 17
 Met Gln Thr Pro Glu Pro Phe Thr Asp Leu Glu His Glu Pro His Thr
 1 5 10 15
 Pro Leu Leu Asp His His His Asn Pro Pro Pro Gln Thr Thr Thr Lys
 20 25 30
 Pro Leu Phe Thr Arg Val Val Ser Gly Val Thr Phe Val Leu Phe Phe
 35 40 45
 Phe Gly Phe Ala Ile Val Phe Ile Val Leu Asn Gln Gln Asn Ser Ser
 50 55 60
 Val Arg Ile Val Thr Asn Ser Glu Lys Ser Phe Ile Arg Tyr Ser Gln
 65 70 75 80
 Thr Asp Arg Leu Ser Trp Glu Arg Thr Ala Phe His Phe Gln Pro Ala
 85 90 95
 Lys Asn Phe Ile Tyr Asp Pro Asp Gly Gln Leu Phe His Met Gly Trp
 100 105 110
 Tyr His Met Phe Tyr Gln Tyr Asn Pro Tyr Ala Pro Val Trp Gly Asn
 115 120 125
 Met Ser Trp Gly His Ser Val Ser Lys Asp Met Ile Asn Trp Tyr Glu
 130 135 140
 Leu Pro Val Ala Met Val Pro Thr Glu Trp Tyr Asp Ile Glu Gly Val
 145 150 155 160

Leu Ser Gly Ser Thr Thr Val Leu Pro Asn Gly Gln Ile Phe Ala Leu
 165 170 175
 Tyr Thr Gly Asn Ala Asn Asp Phe Ser Gln Leu Gln Cys Lys Ala Val
 180 185 190
 Pro Val Asn Leu Ser Asp Pro Leu Leu Ile Glu Trp Val Lys Tyr Glu
 195 200 205
 Asp Asn Pro Ile Leu Tyr Thr Pro Pro Gly Ile Gly Leu Lys Asp Tyr
 210 215 220
 Arg Asp Pro Ser Thr Val Trp Thr Gly Pro Asp Gly Lys His Arg Met
 225 230 235 240
 Ile Met Gly Thr Lys Arg Gly Asn Thr Gly Met Val Leu Val Tyr Tyr
 245 250 255
 Thr Thr Asp Tyr Thr Asn Tyr Glu Leu Leu Asp Glu Pro Leu His Ser
 260 265 270
 Val Pro Asn Thr Asp Met Trp Glu Cys Val Asp Phe Tyr Pro Val Ser
 275 280 285
 Leu Thr Asn Asp Ser Ala Leu Asp Met Ala Ala Tyr Gly Ser Gly Ile
 290 295 300
 Lys His Val Ile Lys Glu Ser Trp Glu Gly His Gly Met Asp Trp Tyr
 305 310 315 320
 Ser Ile Gly Thr Tyr Asp Ala Ile Asn Asp Lys Trp Thr Pro Asp Asn
 325 330 335
 Pro Glu Leu Asp Val Gly Ile Gly Leu Arg Cys Asp Tyr Gly Arg Phe
 340 345 350
 Phe Ala Ser Lys Ser Leu Tyr Asp Pro Leu Lys Lys Arg Arg Ile Thr
 355 360 365
 Trp Gly Tyr Val Gly Glu Ser Asp Ser Ala Asp Gln Asp Leu Ser Arg
 370 375 380
 Gly Trp Ala Thr Val Tyr Asn Val Gly Arg Thr Ile Val Leu Asp Arg
 385 390 395 400
 Lys Thr Gly Thr His Leu Leu His Trp Pro Val Glu Glu Val Glu Ser
 405 410 415
 Leu Arg Tyr Asn Gly Gln Glu Phe Lys Glu Ile Lys Leu Glu Pro Gly
 420 425 430
 Ser Ile Ile Pro Leu Asp Ile Gly Thr Ala Thr Gln Leu Asp Ile Val
 435 440 445
 Ala Thr Phe Glu Val Asp Gln Ala Ala Leu Asn Ala Thr Ser Glu Thr
 450 455 460
 Asp Asp Ile Tyr Gly Cys Thr Thr Ser Leu Gly Ala Ala Gln Arg Gly
 465 470 475 480

Ser Leu Gly Pro Phe Gly Leu Ala Val Leu Ala Asp Gly Thr Leu Ser
 485 490 495
 Glu Leu Thr Pro Val Tyr Phe Tyr Ile Ala Lys Lys Ala Asp Gly Gly
 500 505 510
 Val Ser Thr His Phe Cys Thr Asp Lys Leu Arg Ser Ser Leu Asp Tyr
 515 520 525
 Asp Gly Glu Arg Val Val Tyr Gly Gly Thr Val Pro Val Leu Asp Asp
 530 535 540
 Glu Glu Leu Thr Met Arg Leu Leu Val Asp His Ser Ile Val Glu Gly
 545 550 555 560
 Phe Ala Gln Gly Gly Arg Thr Val Ile Thr Ser Arg Ala Tyr Pro Thr
 565 570 575
 Lys Ala Ile Tyr Glu Gln Ala Lys Leu Phe Leu Phe Asn Asn Ala Thr
 580 585 590
 Gly Thr Ser Val Lys Ala Ser Leu Lys Ile Trp Gln Met Ala Ser Ala
 595 600 605
 Pro Ile His Gln Tyr Pro Phe
 610 615
 <210> 18
 <211> 630
 <212> PRT
 <213> *Helianthus tuberosus*
 <400> 18
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 Pro Glu Asn Leu Pro Glu Leu Thr Gly Ser Pro Thr Thr Arg Arg Leu
 20 25 30
 Ser Ile Ala Lys Val Leu Ser Gly Ile Leu Val Ser Val Leu Val Ile
 35 40 45
 Gly Ala Leu Val Ala Leu Ile Asn Asn Gln Thr Tyr Glu Ser Pro Ser
 50 55 60
 Ala Thr Thr Phe Val Thr Gln Leu Pro Asn Ile Asp Leu Lys Arg Val
 65 70 75 80
 Pro Gly Lys Leu Asp Ser Ser Ala Glu Val Glu Trp Gln Arg Ser Thr
 85 90 95
 Tyr His Phe Gln Pro Asp Lys Asn Phe Ile Ser Asp Pro Asp Gly Pro
 100 105 110
 Met Tyr His Met Gly Trp Tyr His Leu Phe Tyr Gln Tyr Asn Pro Gln
 115 120 125
 Ser Ala Ile Trp Gly Asn Ile Thr Trp Gly His Ser Val Ser Lys Asp
 130 135 140

Met Ile Asn Trp Phe His Leu Pro Phe Ala Met Val Pro Asp His Trp
 145 150 155 160
 Tyr Asp Ile Glu Gly Val Met Thr Gly Ser Ala Thr Val Leu Pro Asn
 165 170 175
 Gly Gln Ile Ile Met Leu Tyr Ser Gly Asn Ala Tyr Asp Leu Ser Gln
 180 185 190
 Val Gln Cys Leu Ala Tyr Ala Val Asn Ser Ser Asp Pro Leu Leu Ile
 195 200 205
 Glu Trp Lys Lys Tyr Glu Gly Asn Pro Val Leu Leu Pro Pro Pro Gly
 210 215 220
 Val Gly Tyr Lys Asp Phe Arg Asp Pro Ser Thr Leu Trp Ser Gly Pro
 225 230 235 240
 Asp Gly Glu Tyr Arg Met Val Met Gly Ser Lys His Asn Glu Thr Ile
 245 250 255
 Gly Cys Ala Leu Ile Tyr His Thr Thr Asn Phe Thr His Phe Glu Leu
 260 265 270
 Lys Glu Glu Val Leu His Ala Val Pro His Thr Gly Met Trp Glu Cys
 275 280 285
 Val Asp Leu Tyr Pro Val Ser Thr Val His Thr Asn Gly Leu Asp Met
 290 295 300
 Val Asp Asn Gly Pro Asn Val Lys Tyr Val Leu Lys Gln Ser Gly Asp
 305 310 315 320
 Glu Asp Arg His Asp Trp Tyr Ala Ile Gly Ser Tyr Asp Ile Val Asn
 325 330 335
 Asp Lys Trp Tyr Pro Asp Asp Pro Glu Asn Asp Val Gly Ile Gly Leu
 340 345 350
 Arg Tyr Asp Phe Gly Lys Phe Tyr Ala Ser Lys Thr Phe Tyr Asp Gln
 355 360 365
 His Lys Lys Arg Arg Val Leu Trp Gly Tyr Val Gly Glu Thr Asp Pro
 370 375 380
 Gln Lys Tyr Asp Leu Ser Lys Gly Trp Ala Asn Ile Leu Asn Ile Pro
 385 390 395 400
 Arg Thr Val Val Leu Asp Leu Glu Thr Lys Thr Asn Leu Ile Gln Trp
 405 410 415
 Pro Ile Glu Glu Thr Glu Asn Leu Arg Ser Lys Lys Tyr Asp Glu Phe
 420 425 430
 Lys Asp Val Glu Leu Arg Pro Gly Ala Leu Val Pro Leu Glu Ile Gly
 435 440 445
 Thr Ala Thr Gln Leu Asp Ile Val Ala Thr Phe Glu Ile Asp Gln Lys
 450 455 460

Met Leu Glu Ser Thr Leu Glu Ala Asp Val Leu Phe Asn Cys Thr Thr
465 470 475 480

Ser Glu Gly Ser Val Ala Arg Ser Val Leu Gly Pro Phe Gly Val Val
485 490 495

Val Leu Ala Asp Ala Gln Arg Ser Glu Gln Leu Pro Val Tyr Phe Tyr
500 505 510

Ile Ala Lys Asp Ile Asp Gly Thr Ser Arg Thr Tyr Phe Cys Ala Asp
515 520 525

Glu Thr Arg Ser Ser Lys Asp Val Ser Val Gly Lys Trp Val Tyr Gly
530 535 540

Ser Ser Val Pro Val Leu Pro Gly Glu Lys Tyr Asn Met Arg Leu Leu
545 550 555 560

Val Asp His Ser Ile Val Glu Gly Phe Ala Gln Asn Gly Arg Thr Val
565 570 575

Val Thr Ser Arg Val Tyr Pro Thr Lys Ala Ile Tyr Asn Ala Ala Lys
580 585 590

Val Phe Leu Phe Asn Asn Ala Thr Gly Ile Ser Val Lys Ala Ser Ile
595 600 605

Lys Ile Trp Lys Met Gly Glu Ala Glu Leu Asn Pro Phe Pro Leu Pro
610 615 620

Gly Trp Thr Phe Glu Leu
625 630

<210> 19
<211> 2115
<212> DNA
<213> Triticum aestivum

<400> 19
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<210> 20
<211> 600
<212> PRT
<213> Triticum aestivum

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Ser Ser Ser Glu Glu Arg Ala Gly Gly Leu Arg Val Asp Glu Glu
          35          40          45
Ala Ala Ala Gly Phe Pro Trp Ser Asn Glu Met Leu Gln Trp Gln Arg
          50          55          60
Ser Gly Tyr His Phe Gln Thr Ala Lys Asn Tyr Met Ser Asp Pro Asn
          65          70          75          80
Gly Leu Met Tyr Trp Asn Gly Trp Tyr His Met Phe Phe Gln Tyr Asn
          85          90          95
Pro Val Gly Thr Asp Trp Asp Asp Gly Met Glu Trp Gly His Ala Val
          100          105          110
Ser Arg Asn Leu Val Thr Trp Arg Thr Leu Pro Ile Ala Met Val Ala
          115          120          125
Asp Gln Trp Tyr Asp Ile Leu Gly Val Leu Ser Gly Ser Met Thr Val
          130          135          140
Leu Pro Asn Gly Thr Val Ile Met Ile Tyr Thr Gly Ala Thr Asn Ala
          145          150          155          160
Ser Ala Val Glu Val Gln Cys Ile Ala Thr Pro Ala Asp Pro Asn Asp
          165          170          175
Pro Phe Leu Arg Arg Trp Thr Lys His Pro Ala Asn Pro Val Ile Trp
          180          185          190

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Ser Pro Pro Gly Ile Gly Thr Lys Asp Phe Arg Asp Pro Met Thr Ala
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 Trp Tyr Asp Glu Ser Asp Asp Thr Trp Arg Thr Leu Leu Gly Ser Lys
 210 215 220
 Asp Asp His Asp Gly His His Asp Gly Ile Ala Met Met Tyr Lys Thr
 225 230 235 240
 Lys Asp Phe Leu Asn Tyr Glu Leu Ile Pro Gly Ile Leu His Arg Val
 245 250 255
 Gln Arg Thr Gly Glu Trp Glu Cys Ile Asp Phe Tyr Pro Val Gly His
 260 265 270
 Arg Ser Asn Asp Asn Ser Ser Glu Met Leu His Val Leu Lys Ala Ser
 275 280 285
 Met Asp Asp Glu Arg His Asp Tyr Tyr Ser Leu Gly Thr Tyr Asp Ser
 290 295 300
 Ala Ala Asn Ala Trp Thr Pro Ile Asp Pro Glu Leu Asp Leu Gly Ile
 305 310 315 320
 Gly Leu Arg Tyr Asp Trp Gly Lys Phe Tyr Ala Ser Thr Ser Phe Tyr
 325 330 335
 Asp Pro Ala Lys Lys Arg Arg Val Leu Met Gly Tyr Val Gly Glu Val
 340 345 350
 Asp Ser Lys Arg Ala Asp Val Val Lys Gly Trp Ala Ser Ile Gln Ser
 355 360 365
 Val Pro Arg Thr Ile Ala Leu Asp Glu Lys Thr Arg Thr Asn Leu Leu
 370 375 380
 Leu Trp Pro Val Glu Glu Ile Glu Thr Leu Arg Leu Asn Ala Thr Glu
 385 390 395 400
 Leu Ser Asp Val Thr Leu Asn Thr Gly Ser Val Ile His Ile Pro Leu
 405 410 415
 Arg Gln Gly Thr Gln Leu Asp Ile Glu Ala Thr Phe His Leu Asp Ala
 420 425 430
 Ser Ala Val Ala Ala Leu Asn Glu Ala Asp Val Gly Tyr Asn Cys Ser
 435 440 445
 Ser Ser Gly Gly Ala Val Asn Arg Gly Ala Leu Gly Pro Phe Gly Leu
 450 455 460
 Leu Val Leu Ala Ala Gly Asp Arg Arg Gly Glu Gln Thr Ala Val Tyr
 465 470 475 480
 Phe Tyr Val Ser Arg Gly Leu Asp Gly Gly Leu His Thr Ser Phe Cys
 485 490 495
 Gln Asp Glu Leu Arg Ser Ser Arg Ala Lys Asp Val Thr Lys Arg Val
 500 505 510

Ile Gly Ser Thr Val Pro Val Leu Asp Gly Glu Ala Phe Ser Met Arg
515 520 525

Val Leu Val Asp His Ser Ile Val Gln Gly Phe Ala Met Gly Gly Arg
530 535 540

Thr Thr Met Thr Ser Arg Val Tyr Pro Met Glu Ala Tyr Gln Glu Ala
545 550 555 560

Lys Val Tyr Leu Phe Asn Asn Ala Thr Gly Ala Ser Val Met Ala Glu
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Arg Leu Val Val His Glu Met Asp Ser Ala His Asn Gln Leu Ser Asn
580 585 590

Met Asp Asp His Ser Tyr Val Gln
595 600

<210> 21
<211> 625
<212> PRT
<213> Hordeum vulgare

<400> 21
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Ala Cys Ala Thr Val Leu Thr Ala Ser Ala Met Ala Val Val Val Val
35 40 45

Gly Ala Thr Leu Leu Ala Gly Leu Arg Met Glu Gln Ala Val Asp Glu
50 55 60

Glu Ala Ala Ala Gly Gly Phe Pro Trp Ser Asn Glu Met Leu Gln Trp
65 70 75 80

Gln Arg Ser Gly Tyr His Phe Gln Thr Ala Lys Asn Tyr Met Ser Asp
85 90 95

Pro Asn Gly Leu Met Tyr Tyr Arg Gly Trp Tyr His Met Phe Tyr Gln
100 105 110

Tyr Asn Pro Val Gly Thr Asp Trp Asp Asp Gly Met Glu Trp Gly His
115 120 125

Ala Val Ser Arg Asn Leu Val Gln Trp Arg Thr Leu Pro Ile Ala Met
130 135 140

Val Ala Asp Gln Trp Tyr Asp Ile Leu Gly Val Leu Ser Gly Ser Met
145 150 155 160

Thr Val Leu Pro Asn Gly Thr Val Ile Met Ile Tyr Thr Gly Ala Thr
165 170 175

Asn Ala Ser Ala Val Glu Val Gln Cys Ile Ala Thr Pro Ala Asp Pro
180 185 190

Asn Asp Pro Leu Leu Arg Arg Trp Thr Lys His Pro Ala Asn Pro Val
 195 200 205
 Ile Trp Ser Pro Pro Gly Val Gly Thr Lys Asp Phe Arg Asp Pro Met
 210 215 220
 Thr Ala Trp Tyr Asp Glu Ser Asp Glu Thr Trp Arg Thr Leu Leu Gly
 225 230 235 240
 Ser Lys Asp Asp His Asp Gly His His Asp Gly Ile Ala Met Met Tyr
 245 250 255
 Lys Thr Lys Asp Phe Leu Asn Tyr Glu Leu Ile Pro Gly Ile Leu His
 260 265 270
 Arg Val Val Arg Thr Gly Glu Trp Glu Cys Ile Asp Phe Tyr Pro Val
 275 280 285
 Gly Arg Arg Ser Ser Asp Asn Ser Ser Glu Met Leu His Val Leu Lys
 290 295 300
 Ala Ser Met Asp Asp Glu Arg His Asp Tyr Tyr Ser Leu Gly Thr Tyr
 305 310 315 320
 Asp Ser Ala Ala Asn Thr Trp Thr Pro Ile Asp Pro Glu Leu Asp Leu
 325 330 335
 Gly Ile Gly Leu Arg Tyr Asp Trp Gly Lys Phe Tyr Ala Ser Thr Ser
 340 345 350
 Phe Tyr Asp Pro Ala Lys Asn Arg Arg Val Leu Met Gly Tyr Val Gly
 355 360 365
 Glu Val Asp Ser Lys Arg Ala Asp Val Val Lys Gly Trp Ala Ser Ile
 370 375 380
 Gln Ser Val Pro Arg Thr Val Ala Leu Asp Glu Lys Thr Arg Thr Asn
 385 390 395 400
 Leu Leu Leu Trp Pro Val Glu Glu Ile Glu Thr Leu Arg Leu Asn Ala
 405 410 415
 Thr Glu Leu Thr Asp Val Thr Ile Asn Thr Gly Ser Val Ile His Ile
 420 425 430
 Pro Leu Arg Gln Gly Thr Gln Leu Asp Ile Glu Ala Ser Phe His Leu
 435 440 445
 Asp Ala Ser Ala Val Ala Ala Leu Asn Glu Ala Asp Val Gly Tyr Asn
 450 455 460
 Cys Ser Ser Ser Gly Gly Ala Val Asn Arg Gly Ala Leu Gly Pro Phe
 465 470 475 480
 Gly Leu Leu Val Leu Ala Ala Gly Asp Arg Arg Gly Glu Gln Thr Ala
 485 490 495
 Val Tyr Phe Tyr Val Ser Arg Gly Leu Asp Gly Gly Leu His Thr Ser
 500 505 510

